

Amendments to the Claims

1-4. (Canceled)

5. (Withdrawn) An apparatus for reproducing a watermark from watermarked contents data, comprising:

pattern generating means for generating bits representing a predetermined bit pattern;

operation means for selecting specified bits among bits in watermark-added picture data, for repetitively changing the currently-selected specified bits from ones to others, and for executing given logical operation between the predetermined bit pattern and a bit pattern represented by the currently-selected specified bits;

embedding-position detecting means for deciding whether or not a result of the given logical operation is equal to a specified bit pattern, and for, when the result of the given logical operation is equal to the specified bit pattern, deciding that the currently-selected specified bits correspond to a watermark-embedded region; and

converting means for changing one of a luminance and a color hue represented by a portion of the watermark-added picture data which corresponds to one of the watermark-embedded region and a region adjoining the watermark-embedded region.

6. (Withdrawn) An apparatus as recited in claim 5, wherein the predetermined bit pattern and the specified bit pattern remain unchanged when being rotated through one of 90, 180, and 270 degrees.

7. (Withdrawn) A method of reproducing a watermark from watermarked contents data, comprising the steps of:

generating bits representing a predetermined bit pattern;

selecting specified bits among bits in watermark-added picture data;

repetitively changing the currently-selected specified bits from ones to others;

executing given logical operation between the predetermined bit pattern and a bit pattern represented by the currently-selected specified bits;

deciding whether or not a result of the given logical operation is equal to a specified bit pattern;

when it is decided that the result of the given logical operation is equal to the specified bit pattern, deciding that the currently-selected specified bits correspond to a watermark-embedded region; and

changing one of a luminance and a color hue represented by a portion of the watermark-added picture data which corresponds to one of the watermark-embedded region and a region adjoining the watermark-embedded region.

8. (Withdrawn) A method as recited in claim 7, wherein the predetermined bit pattern and the specified bit pattern remain unchanged when being rotated through one of 90, 180, and 270 degrees.

9-12. (Canceled)

13. (Withdrawn) An apparatus for reproducing a watermark from watermarked contents data, comprising:

pattern generating means for generating bits representing a fixed bit pattern;

random-number generating means for generating random-number data representing a random number;

first operation means for selecting specified bits among bits in watermark-added picture data, for repetitively changing the currently-selected specified bits from ones to others, and for executing given logical operation between the fixed bit pattern and a bit pattern represented by the currently-selected specified bits;

embedding-position detecting means for deciding whether or not a result of the given logical operation by the first operation means is equal to a specified bit pattern, and for, when the result of the given logical operation by the first operation means is equal to the specified bit pattern, deciding that the currently-selected specified bits correspond to a first part of a watermark-embedded position; and

second operation means for executing given logical operation between the random-number data and a portion of the watermark-added picture data which corresponds to a second part of the watermark-embedded position different from the first part thereof to reproduce watermark data from the watermark-added picture data.

14. (Withdrawn) A method of reproducing a watermark from watermarked contents data, comprising the steps of:

generating bits representing a fixed bit pattern;

generating random-number data representing a random number;

selecting specified bits among bits in watermark-added picture data;

repetitively changing the currently-selected specified bits from ones to others;

executing given logical operation between the fixed bit pattern and a bit pattern represented by the currently-selected specified bits;

deciding whether or not a result of the given logical operation is equal to a specified bit pattern;

when the result of the given logical operation is equal to the specified bit pattern, deciding that the currently-selected specified bits correspond to a first part of a watermark-embedded position; and

executing given logical operation between the random-number data and a portion of the watermark-added picture data which corresponds to a second part of the watermark-embedded position different from the first part thereof to reproduce watermark data from the watermark-added picture data.

15-20. (Canceled)

21. (Withdrawn) An apparatus for reproducing a watermark from watermarked contents data, comprising:

pattern generating means for generating bits representing a fixed two-dimensional bit pattern;

random-number generating means for generating random-number data representing a random number;

first operation means for selecting specified bits among bits in watermark-added picture data, for repetitively changing the currently-selected specified bits from ones to others, and for executing given logical operation between the fixed two-dimensional bit pattern and a two-dimensional bit pattern represented by the currently-selected specified bits;

embedding-position detecting means for deciding whether or not a result of the given logical operation by the first operation means is equal to a specified two-dimensional bit pattern, and for, when the result of the given logical operation by the first operation means is equal to the specified two-dimensional bit pattern, deciding that the currently-selected specified bits correspond to a two-dimensional watermark-embedded region; and

second operation means for executing given logical operation between the random-number data and a portion of the watermark-added picture data which corresponds to the two-dimensional watermark-embedded region to reproduce watermark data from the watermark-added picture data.

22. (Withdrawn) An apparatus as recited in claim 21, wherein the embedding-position detecting means comprises means for, when the result of the given logical operation by the first operation means is equal to the specified two-dimensional bit pattern, deciding that the currently-selected specified bits correspond to a first part of the two-dimensional watermark-embedded region, and the second operation means comprises means for executing given logical operation between the random-number data and a portion of the watermark-added picture data which corresponds to a second part of the two-dimensional watermark-embedded region different from the first part thereof to reproduce watermark data from the watermark-added picture data.

23. (Withdrawn) An apparatus as recited in claim 21, wherein the fixed two-dimensional bit pattern and the specified two-dimensional bit pattern remain unchanged when being rotated through one of 90, 180, and 270 degrees.

24. (Withdrawn) A method of reproducing a watermark from watermarked contents data, comprising the steps of:

generating bits representing a fixed two-dimensional bit pattern;
generating random-number data representing a random number;
selecting specified bits among bits in watermark-added picture data;
repetitively changing the currently-selected specified bits from ones to others;
executing given logical operation between the fixed two-dimensional bit pattern and a two-dimensional bit pattern represented by the currently-selected specified bits;
deciding whether or not a result of the given logical operation is equal to a specified two-dimensional bit pattern;
when the result of the given logical operation is equal to the specified two-dimensional bit pattern, deciding that the currently-selected specified bits correspond to a two-dimensional watermark-embedded region; and
executing given logical operation between the random-number data and a portion of the watermark-added picture data which corresponds to the two-dimensional watermark-embedded region to reproduce watermark data from the watermark-added picture data.

25. (Withdrawn) A method as recited in claim 24, wherein the fixed two-dimensional bit pattern and the specified two-dimensional bit pattern remain unchanged when being rotated through one of 90, 180, and 270 degrees.

26. (Currently amended) An apparatus ~~as recited in claim 18, for embedding a watermark into original picture data, comprising:~~

pattern generating means for generating a fixed two-dimensional bit pattern which remains unchanged when being rotated through one of 90, 180, and 270 degrees;
embedding-position deciding means for deciding a two-dimensional watermark-embedding region with respect to the original picture data;
random-number generating means for generating random-number data representing a random number;

data-storing and calculating means for storing pattern data representing a specified two-dimensional bit pattern which remains unchanged when being rotated through one of 90, 180, and 270 degrees, and for performing given logical operation between the fixed two-dimensional bit pattern and the specified two-dimensional bit pattern to calculate a desired two-dimensional bit pattern for specified bits, the specified bits being among bits in a first portion of the original picture data which corresponds to a first part of the two-dimensional watermark-embedding region;

operation means for executing the given logical operation between watermark data and the random-number data; and

mixing means for changing the specified bits to represent the desired two-dimensional bit pattern, and for embedding a result of the given logical operation executed by the operation means in a second portion of the original picture data which corresponds to a second part of the two-dimensional watermark-embedding region different from the first part thereof;

wherein the fixed two-dimensional bit pattern has a square matrix array of bits with a same number of vertical-line bits and horizontal-line bits, and the specified two-dimensional bit pattern has a square matrix array of bits and is equal in size to the fixed two-dimensional bit pattern, the fixed two-dimensional bit pattern being a first "0" and "1" checkered bit pattern, the specified two-dimensional bit pattern being a second "0" and "1" checkered bit pattern different from the first "0" and "1" checkered bit pattern.

27. (Currently amended) A method ~~as recited in claim 20, of embedding a watermark into original picture data, comprising the steps of:~~

generating a fixed two-dimensional bit pattern which remains unchanged when being rotated through one of 90, 180, and 270 degrees;

deciding a two-dimensional watermark-embedding region with respect to the original picture data;

generating random-number data representing a random number;

storing pattern data representing a specified two-dimensional bit pattern which remains unchanged when being rotated through one of 90, 180, and 270 degrees;

performing given logical operation between the fixed two-dimensional bit pattern and the specified two-dimensional bit pattern to calculate a desired two-dimensional bit pattern for specified bits, the specified bits being among bits in a first portion of the original picture data which corresponds to a first part of the two-dimensional watermark-embedding region;

executing the given logical operation between watermark data and the random-number data; and

changing the specified bits to represent the desired two-dimensional bit pattern, and embedding a result of the executed given logical operation in a second portion of the original picture data which corresponds to a second part of the two-dimensional watermark-embedding region different from the first part thereof;

wherein the fixed two-dimensional bit pattern has a square matrix array of bits with a same number of vertical-line bits and horizontal-line bits, and the specified two-dimensional bit pattern has a square matrix array of bits and is equal in size to the fixed two-dimensional bit pattern, the fixed two-dimensional bit pattern being a first "0" and "1" checkered bit pattern, the specified two-dimensional bit pattern being a second "0" and "1" checkered bit pattern different from the first "0" and "1" checkered bit pattern.

28. (Previously presented) An apparatus for embedding a watermark into original picture data, comprising:

map data storing means for storing map data indicating a watermark embedded position, where the watermark should be embedded, with respect to a frame represented by the original picture data;

pattern generating means for generating bits representing a predetermined bit pattern in response to the map data, the predetermined bit pattern corresponding to the watermark and being in a position coincident with the watermark embedded position indicated by the map data, the predetermined bit pattern being a first two-dimensional bit pattern having a square matrix array of bits with a same number of vertical-line bits and horizontal-line bits, the predetermined bit pattern remaining unchanged when being rotated through one of 90, 180, and 270 degrees;

specified-bit detecting means for detecting bits in the original picture data as specified bits into which the watermark can be embedded;

data-storing and calculating means for storing pattern data representing a specified bit pattern being a second two-dimensional bit pattern having a square matrix array of bits and equal in size to the first two-dimensional bit pattern, the specified bit pattern remaining unchanged when being rotated through one of 90, 180, and 270 degrees, the data-storing and calculating means being further for performing given logical operation between the predetermined bit pattern and the specified bit pattern to calculate a desired bit pattern for the specified bits, wherein the desired bit pattern can be converted into the specified bit pattern by the given logical operation with the predetermined bit pattern in a decoder side; and

mixing means for changing the specified bits to represent the desired bit pattern to convert the original picture data into watermark-embedded picture data.

29. (Previously presented) An apparatus as recited in claim 28, wherein the first two-dimensional bit pattern is a first "0" and "1" checkered bit pattern, and the second two-dimensional bit pattern is a second "0" and "1" checkered bit pattern different from the first "0" and "1" checkered bit pattern.

30. (Previously presented) An apparatus as recited in claim 29, wherein the desired bit pattern is formed by bits of "1" only.

31. (Previously presented) A method of embedding a watermark into original picture data, comprising the steps of:

generating map data indicating a watermark embedded position, where the watermark should be embedded, with respect to a frame represented by the original picture data;

generating bits representing a predetermined bit pattern in response to the map data, the predetermined bit pattern corresponding to the watermark and being in a position coincident with the watermark embedded position indicated by the map data, the

predetermined bit pattern being a first two-dimensional bit pattern having a square matrix array of bits with a same number of vertical-line bits and horizontal-line bits, the predetermined bit pattern remaining unchanged when being rotated through one of 90, 180, and 270 degrees;

detecting bits in the original picture data as specified bits into which the watermark can be embedded;

generating pattern data representing a specified bit pattern being a second two-dimensional bit pattern having a square matrix array of bits and equal in size to the first two-dimensional bit pattern, the specified bit pattern remaining unchanged when being rotated through one of 90, 180, and 270 degrees;

performing given logical operation between the predetermined bit pattern and the specified bit pattern to calculate a desired bit pattern for the specified bits, wherein the desired bit pattern can be converted into the specified bit pattern by the given logical operation with the predetermined bit pattern in a decoder side; and

changing the specified bits to represent the desired bit pattern to convert the original picture data into watermark-embedded picture data.

32. (Previously presented) A method as recited in claim 31, wherein the first two-dimensional bit pattern is a first "0" and "1" checkered bit pattern, and the second two-dimensional bit pattern is a second "0" and "1" checkered bit pattern different from the first "0" and "1" checkered bit pattern.

33. (Previously presented) A method as recited in claim 32, wherein the desired bit pattern is formed by bits of "1" only.